## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 24, 2010 has been entered.

### *Claim Objections*

1. Claim 2 is objected to because of the following informalities: step a recites a drying step to heat the glass pipe and blowing an inert gas. The limitation appears to be grammatically incorrect. The drying step does not result in heating the pipe or blowing of an inert gas. Instead, the drying step "comprises" heating the glass pipe and blowing an inert gas. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2-6, 8-23 and 28 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 2 recites a drying step to heat the glass

pipe and blowing an inert gas. It is unclear if the blowing of the inert gas is a step performed during the drying of the pipe or if it is a separate step performed regardless of the drying step.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 2-4, 6, 8, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya et al. (4,772,303) in view of Berkey et al. (2003/0024278) and Ito et al. (JP 2002-249332- machine translation). Regarding claim 2, Kamiya et al. disclose a method for producing an optical fiber comprising:

a. a drying step to heat the glass pipe at a temperature of 550°C or below;

b. a sealing step to seal one end of the glass pipe (col. 3 lines 11-26); and

c. a collapsing step to collapse the glass pipe to obtain a solid body (col. 3 lines 60-68).

Although the drying step is not performed before the sealing step, it would have been obvious to one of ordinary skill in the art at the time of the invention to select the order of the steps, i.e. to have performed the drying step prior to the sealing step in the absence of new or unexpected results. Furthermore, the drying step effectively removes moisture by heating the tube to a temperature less than 500°C and the sealing steps essentially provides pressure control within the tube. One of ordinary skill would have recognized that performing the drying step before or after the sealing step would not have altered the predicable result that moisture is removed since the act of heating

the tube is performed. All the claimed steps are known in the prior art and one skill in the art could have combined the steps and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

2. Kamiya teaches drying but does not teach utilizing an inert gas in the drying step. Berkey teaches supplying a dry inert gas or alternatively a drying gas to the inside of a glass pipe to prevent moisture contamination of the preform ([0090]). The dry inert gas of Berkey is interpreted to be dry and therefore contains hydrogen containing substance at a very low concentration, such as none. It would have been obvious to one of ordinary skill in the art at the time of the invention to have similarly blown a dry inert gas through the glass pipe of Kamiya to promote the further drying of the glass pipe and prevent moisture contamination of the pipe.

3. Kamiya fails to disclose a pressure of 4kPa or less during the collapsing step. Ito teaches a method for producing an optical fiber preform comprising collapsing a pipe onto a base material while applying a vacuum pressure in the annular between the pipe and the base material. More specifically, Ito teaches that an example "a" employing a vacuum pressure of 100kPa for the collapsing of the pipe ([0033]-[0036], Table 1). Ito further teaches the pressure for collapsing the pipe can be optimized based on the size of the pipe used and the size of the base material in order to achieve a unified preform without bubbles and large eccentricity. It would have been obvious to one of ordinary skill in the art at the time of the invention to employ pressure, such as 100kPa, as demonstrated by Ito in the collapsing step of Kamiya in order to control generation of bubbles inside the preform. Similarly, it would have been obvious to one of ordinary

skill in the art at the time of the invention to have optimized the pressure employed in collapsing the tube since it has been shown to be a result effective variable for achieving uniform collapsing of the tube while preventing the formation of bubbles in the preform, as demonstrated by Ito.

4. Regarding claims 3 and 4, Kamiya et al. disclose a drying temperature range of 100°C to 500°C (col. 3 lines 21-22), which is clearly above 60°C and/or 300°C.

5. Regarding claim 6, Kamiya et al. disclose in figure 2, a furnace 51 for heating the tube in the drying step, which clearly covers a longitudinal range including and wider than the section of the tube comprising the inner layer 30, which is the section of the tube exposed to the collapsing temperature at furnace 33.

6. Regarding claim 8, Berkey teaches controlling the amount of gas flow to the center of the pipe depending on the desired pressure in the pipe ([0091]). Although the amount of gas utilized is not specifically discloses, Berkey teaches controlling the amount of gas flow with a gas pump, pressurized gas supply, pressure sensors and control valves. It would have been obvious to one of ordinary skill in the art at the time of the invention to have controlled the volume of gas blown in to the glass pipe of Kamiya to any desired volume (such as at least 10 times the inner volume of the pipe) to properly remove the moisture within the pipe and prevent any recontamination.

7. Regarding claim 13, Kamiya discloses reducing the pressure in the pipe to below 4 kPa in the drying step (col. 2 lines 39-49, col. 3 lines 18-41).

8. Regarding claim 15, Kamiya discloses a glass depositing step for the inner surface of the tube (col. 2 lines 15-20).

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya et al. (4,772,303), Berkey et al. (2003/0024278) and Ito et al. (JP 2002-249332- machine translation), as applied to claim 2 above, in further view of DiGiovanni et al. (6,966,201). Kamiya et al. disclose a first drying step at a temperature range of 100°C to 500°C, wherein 100°C clearly falls within the range of 60-200°C. DiGiovanni et al. teach a purify step followed by a drying step at a temperature of 700°C, which is above 300°C (col. 5 line 62 to col. 6 line 7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the drying step at 700°C of DiGiovanni et al. in the process of Kamiya et al. in order further remove moisture.

10. Claims 9 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya et al. (4,772,303), Berkey et al. (2003/0024278) and Ito et al. (JP 2002-249332- machine translation), as applied to claim 2 above, in further view of Onishi et al. (Derwent Abstract of JP 08-067524). Kamiya et al. fail to disclose holding pipes. Onishi et al. teach holding pipes connected to at least one end of a glass tube for MCVD processes (drawing 1a, abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize such a holding pipe in the process of Kamiya to allow for the handling of the tube and opening for the flow of various drying gases. Additionally, since the holding pipe is in connection with the tube that is heated, it would have been obvious to one of ordinary skill in the art at the time of the invention to expect that the holding pipe would radiate to the outside of the pipe infrared rays traveling though the wall of the pipe, since heat in the pipe would be conducted to the holding pipe and eventually radiated outside. Although not mentioned

specifically, since the holding pipe of Onishi et al. allows for the passing of gases through the pipe and the tube, it would have been obvious to one of ordinary skill in the art at the time the invention was made to expect that since the pipe is in connection with the tube and in the drying process of the Kamiya, drying gases flowing to the tube would have simultaneously remove hydroxyl groups from the holding pipe as well.

11. Claims 10 and 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya et al. (4,772,303) , Berkey et al. (2003/0024278) and Ito et al. (JP 2002-249332-machine translation), as applied to claim 2 above, in further view of Kunio (JP 62-226829). Kamiya discloses changing pressures in the tube during drying, after the sealing step, but do not disclose a first stage of reducing and second stage of increasing pressure. Kunio teaches a method for manufacturing optical fibers comprising of collapsing a tube and drying the tube in a two stage process including reducing the pressure of the glass pipe and introducing a dried gas into the pipe, essentially raising the pressure inside the tube (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the pressure stages of Kunio in the process of Kamiya et al. in order eliminate contaminates in the tube before drying the tube with a drying gas.

12. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya et al. (4,772,303) , Berkey et al. (2003/0024278) and Ito et al. (JP 2002-249332-machine translation), as applied to claim 2 above, in further view of Homa (2003/0213268). Kamiya et al. fail to disclose a drying time. Homa teaches drying a glass tube for 1 hr ([0033]). It would have been obvious to one of ordinary skill in the

art at the time the invention was made to utilize the drying time of Homa in the process of Kamiya in order to ensure reduction of the hydroxyl groups in the glass tube.

13. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya et al. (4,772,303) , Berkey et al. (2003/0024278) and Ito et al. (JP 2002-249332-machine translation), as applied to claim 2 above, in further view of Chang et al. (2002/0194877). Kamiya et al. fail to disclose inserting a rod in the tube. Chang et al. suggest the many known ways to manufacture an optical fiber preform including deposition inside a tube and inserting a rod into a tube ([0005], [0027], [0028]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the method step of inserting a rod into the tube, as suggest by Chang et al., because it is a well known method to manufacture a preform for optical fiber and to allow for overcladding of a rod.

14. Claims 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya et al. (4,772,303) , Berkey et al. (2003/0024278) and Ito et al. (JP 2002-249332-machine translation), as applied to claim 2 above, in further view of Homa (2003/0213268) and Yokota et al. (4,793,842). Kamiya et al. fail to disclose an etching step. It is apparent to one skill in the art to know the importance of removing moisture in the many method steps in manufacturing an optical preform. Homa teaches a variation of the process wherein a glass tube is etched with a gas and then dried ([0033]). Yokota et al. teach another variation where etching of the glass tube is done with drying the tube (col. 3 lines 24-42). Both Homa and Yokota et al. teach the need to dry the glass tub to ensure that hydroxyl groups are removed along the many various steps in

manufacturing a preform. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the combination of steps of drying, etching, and drying or etching and drying, as suggested by Homa and Yokota et al. in the process of Kamiya et al. in order to ensure that hydroxyl groups have been removed from the tube during any number of various steps in the manufacturing process. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the etching step in a longitudinal range, similarly to the drying step of Kamiya as discussed in claim 6 above, in order to properly encompass the critical optical fiber region comprising the core.

15. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya et al. (4,772,303) , Berkey et al. (2003/0024278) and Ito et al. (JP 2002-249332- machine translation), as applied to claim 2 above, in further view of DiGiovanni et al. (6,966,201). Kamiya et al. fail to disclose a purifying step specifically. DiGiovanni et al. teach drying a glass tube, followed by a chemical purifying step with chlorine gas and another drying step (col. 5 lines 18-27, 62-66, col. 6 lines 4-7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the purifying step of DiGiovanni et al. in the process of Kamiya et al. in order to purify the soot body located within the tube.

16. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya et al. (4,772,303) in view of Berkey et al. (2003/0024278) and Ito et al. (JP 2002-249332- machine translation). Kamiya et al. disclose a method for producing an optical fiber comprising:

d. a drying step to heat the glass pipe at a temperature of 550°C or below;

e. a sealing step to seal one end of the glass pipe (col. 3 lines 11-26); and

f. a collapsing step to collapse the glass pipe to obtain a solid body while maintaining gas introduction and evacuating an inside of the glass pipe (col. 3 lines 60-68, col. 2 lines 39-52).

Although the drying step is not performed before the sealing step, it would have been obvious to one of ordinary skill in the art at the time of the invention to select the order of the steps, i.e. to have performed the drying step prior to the sealing step in the absence of new or unexpected results. Furthermore, the drying step effectively removes moisture by heating the tube to a temperature less than 500°C and the sealing steps essentially provides pressure control within the tube. One of ordinary skill would have recognized that performing the drying step before or after the sealing step would not have altered the predicable result that moisture is removed since the act of heating the tube is performed. All the claimed steps are known in the prior art and one skill in the art could have combined the steps and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

17. Kamiya fails to disclose pulling a vacuum during the collapsing step, but does not disclose a specific amount. Ito teaches a method for producing an optical fiber preform comprising collapsing a pipe onto a base material while applying a vacuum pressure in the annular between the pipe and the base material. More specifically, Ito teaches that an example "a" employing a vacuum pressure of 100kPa for the collapsing of the pipe ([0033]-[0036], Table 1). Ito further teaches the pressure for collapsing the pipe can be

optimized based on the size of the pipe used and the size of the base material in order to achieve a unified preform without bubbles and large eccentricity. It would have been obvious to one of ordinary skill in the art at the time of the invention to employ pressure, such as 100kPa, as demonstrated by Ito in the collapsing step of Kamiya in order to control generation of bubbles inside the preform. Similarly, it would have been obvious to one of ordinary skill in the art at the time of the invention to have optimized the pressure employed in collapsing the tube since it has been shown to be a result effective variable for achieving uniform collapsing of the tube while preventing the formation of bubbles in the preform, as demonstrated by Ito.

18. Kamiya teaches drying but does not teach utilizing an inert gas in the drying step. Berkey teaches supplying an dry inert gas or alternatively a drying gas to the inside of a glass pipe to prevent moisture contamination of the preform ([0090]). The dry inert gas of Berkey is interpreted to be dry and therefore contains hydrogen containing substance at a very low concentration, such as none. It would have been obvious to one of ordinary skill in the art at the time of the invention to have similarly blown a dry inert gas through the glass pipe of Kamiya to promote the further drying of the glass pipe and prevent moisture contamination of the pipe.

***Response to Arguments***

3. Applicant's arguments with respect to claim 2 and 28 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to QUEENIE DEHGHAN whose telephone number is (571)272-8209. The examiner can normally be reached on Monday through Friday 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Queenie Dehghan/
Examiner, Art Unit 1791